

**REMARKS**

This is in support of the Applicant's Request for Continued Examination pursuant to 37 C.F.R. § 1.114, and in response to the Final Office Action, mailed July 20, 2001 (the "Action") in accordance with 37 C.F.R. § 1.111. Applicant requests that the time period to respond to the Action be extended one month, from October 20, 2001 to November 20, 2001. A check in the amount of \$110 is enclosed for the one-month extension fee.

Reconsideration and allowance of all of the claims of the present application in view of the foregoing amendment and the following remarks is requested respectfully.

**Status of the Claims**

Claims 1-4, 7 and 8 are presented. No claims have been added or canceled, claim 1 has been amended.

**Summary Of The Claimed Invention**

The presently claimed invention relates to improvements in disc rotor thermal fatigue and wear-resistance by a selection and balance of additives which avoids a detrimental micro-structure with inner-granular carbide eutectic phases and also gives higher wear-resistance. The composition comprises between 0.35 and 0.45% by weight of vanadium and between 0.025 and 0.035% by weight of titanium (an amount of titanium representing between 1/10 and 1/18 the amount of vanadium) and between 0.675 and 1.2% by weight of copper. Improved wear and frictional properties are achieved without the problems of hot-spotting and manufacturing difficulties.

**The Final Office Action**

Claims 1-4, 7 and 8 stand rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,948,353 to Lawrence et al. (the "Lawrence patent") in view of the Applicant's admission of prior art and further in view of U.K. Patent Application 737,510 to Madsen (the "Madsen patent"). Claims 1, 3, 4, and 7 also stand rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over the Madsen patent in view of Japan Patent No. 02138438 to Akiyama et al. (the "Akiyama patent") or the Lawrence patent and further in view of the Applicant's admission of prior art. These rejections are traversed respectfully.

**Obviousness**

The claims of a patent measure and define the invention. *Jones v. Hardy*, 727 F.2d 1524, 1528 (Fed. Cir. 1984). A determination of obviousness requires an evaluation of the prior art references with respect to the claimed invention. *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 890 (Fed. Cir. 1984); *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1574-75 (Fed. Cir. 1984). Obviousness cannot be established simply by combining the teachings of the prior art to produce the claimed invention. To establish a *prima facie* case of obviousness, there must be some teaching, suggestion or incentive in the prior art sufficient to motivate one of ordinary skill in the art to modify a reference or to combine reference teachings that makes such a combination appropriate. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577 (Fed. Cir. 1984). The test of whether a particular compound described in the prior art may be relied upon to show that the claimed subject matter at issue would have been obvious is whether the prior art provides an *enabling disclosure* with respect to the disclosed prior art

compound. *Ashland Oil, Inc. v. Delta Resins and Refractories, Inc.*, 776 F.2d 281, 297 (Fed. Cir. 1995), *cert. denied*, 475 U.S. 1017 (1986). The teaching or suggestion must come from the references and not from the applicant's disclosure.

### Summary of the Applicant's Argument

In the present case, the references identified in the § 103(a) rejections, taken singly or in combination, are insufficient to serve as the basis for an obviousness rejection. The essential shortcoming of the Lawrence patent, the first of the two main references, is its lack of an *enabling* disclosure of cast iron compositions containing titanium and/or vanadium. The disclosure of the use of either titanium or vanadium in the Lawrence patent is so minimal as to be, at most, merely hypothetical and therefore non-enabling. *See Ashland Oil*, 776 F.2d at 296-97. As a result, the combination of the Lawrence patent with the Applicant's admission of prior art and the Madsen patent does not render the presently claimed invention obvious.

With respect to the Madsen patent, the other of the two main references, the compositions disclosed therein are distinct from the presently claimed compositions insofar as the amount of titanium disclosed in the Madsen patent is defined as between 1/6 to 1/2 of the amount of vanadium. When applied to the presently claimed range of vanadium (0.35 to 0.45 wt.%), the amount of titanium taught in the Madsen patent would be set between 0.0583 to 0.225 wt.%, a range well above the presently claimed range of titanium (0.025 to 0.035 wt.%). Accordingly, the combination of the Madsen patent with the Akiyama patent or the Lawrence patent and also the Applicant's admission of prior art, does not render the presently claimed invention obvious. The presently claimed composition is directed to a particular combination of

narrow range selections for several of the constituents that are neither taught nor suggested by the prior art.

### **The Lawrence Patent**

The Lawrence patent teaches a disc brake rotor made of gray cast iron. The focus of the Lawrence patent is on the positive effect on wear resistance resulting from the addition of small quantities of tin and also the increased quantities of chromium in iron compositions. Titanium and vanadium are mentioned only as optional extras. More specifically, apart from the mention of “small amounts (less than about 1%) of such elements as titanium and vanadium” (col. 2, ll. 4-5), there is no discussion whatsoever of the role played by either of these materials, nor is there a teaching of compositions containing either of them in any of the examples or in any of the claims. Lacking such a teaching, there is no *enabling* disclosure with respect to compositions containing either titanium or vanadium in the Lawrence patent. Rather, the disclosure of compositions which contain vanadium and/or titanium is merely hypothetical. *See Ashland Oil*, 776 F.2d at 296-97.

### **The § 103 Rejection Based on the Lawrence Patent**

The Lawrence patent is an insufficient basis for a rejection pursuant to 35 U.S.C. § 103(a) because its disclosure of a gray cast iron composition containing titanium and/or vanadium is merely hypothetical. None of the examples shows a formulation that includes either titanium or vanadium nor does the Lawrence patent anywhere provide clear instructions on how to prepare such hypothetical compositions. *See Ashland Oil*, 776 F.2d at 296-97 (hypothetical

structures are not persuasive of obviousness); *see also Application of Hoeksema*, 399 F.2d 269, 274 (Cust. & Pat. App. 1968) ("if the prior art of record fails to disclose or render obvious a method for making a claimed compound, at the time the invention was made, it may not be legally concluded that the compound itself is in the possession of the public."). Accordingly, the combination of the teachings of the Lawrence patent with the Applicant's admission regarding the prior art and Madsen is unavailing as a proper basis for rejection of the pending claims under 35 U.S.C. § 103(a). It is submitted respectfully that the rejection be withdrawn.

**The Madsen Patent**

The Madsen patent discloses piston rings made of cast iron. The compositions disclosed in the Madsen patent are alloys with are specified as containing between 2.50 and 3.90 wt.% carbon, 0.15 to 0.45 wt.% vanadium, and amounts of titanium and copper that are determined in relation to the amount of vanadium present in the composition. With respect to the amount of titanium, the Madsen patent teaches that the amount of titanium is determined as between 1/6 and 1/2 of the amount of vanadium.

**The § 103 Rejection Based on the Madsen Patent**

The Madsen patent is an insufficient basis for a rejection pursuant to 35 U.S.C. § 103(a) because it discloses compositions which neither teach nor suggest the use of titanium in the amounts claimed in the present invention. As set forth above, the compositions of the present invention include between 0.35 and 0.45 wt.% vanadium and between 0.025 and 0.035 wt.%

titanium. If the teachings of Madsen were applied to determine the amount of titanium, the range would be between about 0.058 and 0.225 wt.%.<sup>1</sup> It is evident, however, the claimed compositions require only between 0.025 and 0.035 wt.% titanium, a range well outside the range derived from the teachings of the Madsen patent. Accordingly, the Madsen patent neither teaches nor suggests the presently claimed compositions, and the combination of the teachings of the Madsen patent with the Akiyama patent or the Lawrence patent and also the Applicant's admission of prior art is unavailing as a proper basis for rejection of the pending claims under 35 U.S.C. § 103(a). It is submitted respectfully that the rejection be withdrawn.

**CONCLUSION**

In view of the above amendment and remarks, the Applicant requests respectfully that the Examiner reconsider the outstanding rejections of the claims set forth in the Final Office Action in the prior prosecution. Amendments have been made to further define the invention, and no new matter has been introduced by such amendments. In addition, it is requested respectfully that the Examiner contact the undersigned by telephone at his convenience in the event the

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<sup>1</sup>The low end would be calculated as  $1/6 \times 0.35$  wt.% and the high end would be calculated as  $1/2 \times 0.45$  wt.%.

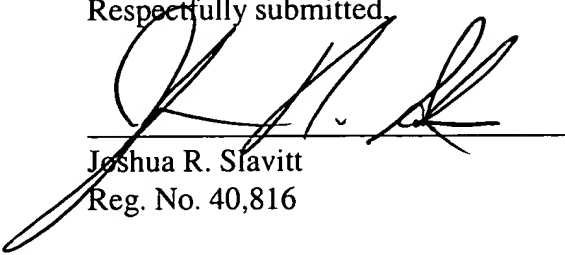
**Attorney Docket No. P-23,815 USA**

**PATENT**

Examiner has any questions or comments regarding the above arguments or continues to believe that the claims remain unpatentable over the prior art.

Respectfully submitted,

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Joshua R. Slavitt  
Reg. No. 40,816

Synnestvedt & Lechner LLP  
2600 ARAMARK Tower  
1101 Market Street  
Philadelphia, PA 19107-2950  
(215) 923-4466  
(215) 923-2189 (FAX)

JRS/

**Version with Markings to Show Changes Made**

1. A disc brake rotor having a grey cast iron composition, wherein said composition comprises between [0.5] 0.675 and 1.2% by weight of copper, and a plurality of hard carbide forming metals including both vanadium and titanium, the vanadium content being between 0.35 and 0.45% by weight and the titanium content being between 0.025 and .035% by weight, the ratio between the weight of copper present and the total weight of said hard carbide forming metals being 1.8 to 3 units of copper to 1 unit of the hard carbide forming metals.